

## **REMARKS**

Consideration of the following remarks and reconsideration and withdrawal of the rejections contained in the Final Office Action dated October 7, 2010 are earnestly solicited.

The present invention relates to the preparation of cellulose ethers from high bulk density raw cotton linters, as opposed to purified cotton linters, or cellulose from other sources. These short fiber length materials have unexpectedly high bulk density. Such materials provide a unique composition that are especially well suited for the commercial manufacture of premium quality cellulose ether derivatives by using either slurry or high solids processes thereby resulting in an increased utilization of plant assets without additional investment.

Additionally, the present invention eliminates costly purification of raw cotton linters. An additional surprising benefit of the present invention is that it can provide unique composition comprised of high molecular weight cellulose materials suitable as feedstock for the production of cellulose derivatives.

### **Claim Rejections – 35 USC § 103**

In paragraph 3, the Office Action rejected claims 41-43, 46, 48, 49, 51, 56, 57, 63-66 and 94-96 and 98-103 under 35 USC § 103(a) as being unpatentable over DE 4034709 (Hayakawa) or Henry et al. (US Patent No. 3,085,087) (Henry) in view of Branan et al. (US Patent No. 2,667,480) (Branan).

Applicants respectfully reassert that the rejection of claims 41-43, 46, 48, 49, 51, 56, 57, 63-66 and 94-96 and 98-103 as being unpatentable over Hayakawa or Henry in view of Branan is traversed for the reason that the combination of either Hayakawa or Henry with Branan would not result in applicants' invention, as claimed. Applicants comments presented in their previous response with regard to Hayakawa, Henry and Branan are repeated herein.

Hayakawa is directed to the use of RCL to manufacture cellulose ethers having a very high viscosity in an aqueous solution for use as an additive in hydraulic cement-based mortars. While Hayakawa does disclose the preparation of cellulose ethers from raw cotton linters, it does not teach or suggest the advantage of using a raw cotton linter having a bulk density of at least 20 g/100 ml and wherein at least 50 wt % of the RCL fibers are in a loose mass that can pass through a US standard sieve size #10 (2 mm opening) as a starting material as is claimed by the applicants.

US Patent No. 3,085,087 to Henry et al. ("Henry"), is directed "...to an improved process or preparing carboxyalkyl cellulose ethers, and, more particularly, to such a process

wherein an improved liquid medium is employed to give uniform and efficient etherification of cellulose and, consequently, alkali-soluble and water-soluble cellulose ethers of improved quality." (Column 1, lines 10-15).

Henry never discloses or teaches the preparation of cellulose ethers from high bulk density raw cotton linters, as claimed by applicants. Henry is directed to an improved liquid medium for use in the production of cellulose ethers. The passages recited by the Office Action are directed to Henry's liquid medium as well as the disclosure of various reactants used in the production of cellulose ethers. However, when Henry discusses the types of cellulose used in producing cellulose ethers, the cellulose is described as "...chemically purified cotton linters, wood pulp and various other cellulosic materials are satisfactory of use in the process...the preferred ones are purified cotton linters and  $\alpha$ -cellulose wood pulp." (Column 6, lines 17-20.). Henry makes no mention of the use of raw cotton linters in general or the raw cotton linter fibers that a bulk density of at least 20 g/100 ml in particular, as taught and claimed by applicants.

US Patent No. 2,667,480 to Branam is directed to "An improved process for producing the sodium salt of carboxymethyl cellulose." (Column 2, lines 24-26.) When disclosing its preferred embodiment of cellulose for use in its process, Branam states that "A preferred embodiment involves the use of purified cellulose in granular form having a bulk density of about 30 pounds per cubic foot and having an average particle size of less than 150 microns." (Column 3, lines 41-45.) (Emphasis added.)

Applicants respectfully submit that Branam does not teach or suggest to a person of ordinary skill in the art to use raw cotton linters as the starting material of the claimed process. In fact, Branam is clearly directed to the use of purified cellulose as a starting material for the production of carboxymethyl cellulose. Since Branam clearly directs a person having ordinary skill in the art to use purified cellulose, there would be no teaching or suggestion to a person of ordinary skill in the art to use a raw cotton linters as the starting material for the production of carboxymethyl cellulose. In fact, applicants respectfully submit that a person of ordinary skill in the art would view the teachings of Branam as teaching away from the use of raw cotton linters, as claimed by applicants, since Branam prefers the use of purified cellulose.

To further distinguish the raw cotton linters of use in the present invention from the purified cellulose used in Branam, applicants have inserted the teaching found at the bottom of page 12, line 34 to page 13, lines 1-2, where the upper limit of the cellulose found in the raw cotton linter is stated as 95 wt%.

In the Office Action's response to applicants' previous response, the Office Action found the arguments presented not persuasive "...since the instant claims recite comminuted raw cotton linter fibers which embraces the cellulose of the Branam et al patent

in granular form. Applicants argue that the cellulose in granular form in Branen et al patent may be at a reduce molecular weight. This argument is not persuasive since the molecular weight of the cellulose ether has not been recited in the instant claims. The amendment of the instant claims to recite that the comminuting is carried out in a rotary cutter does not over come the rejection since the use of this apparatus is known in the art."

Applicants respectfully wish to point out that the present claim 41 has now been amended to recite that the molecular weight of the raw cut cotton linter fibers, as a result of the present process, as determined by intrinsic viscosity (IV) has not been reduced by more than 20% relative to non-comminuted raw cotton linters. Applicants respectfully submit that this new recitation clearly sets forth the benefit of the process of the present invention which was alluded to in their previous response. Applicants respectfully reiterate their previous arguments with regards to the distinguishing the process of the present invention over the process taught in Branen.

Also, applicants respectfully wish to point out that the present claims have been further amended to more clearly set forth that the comminuting of the raw cotton linter is directed to cutting which is carried out in a rotary cutter, as previously claimed. Branen, in contrast, does not teach or suggest the use of a rotary cutter and does not teach how the purified cellulose in granular form having a bulk density of about 30 pounds per cubic foot and having an average particle size of less than 150 microns is obtained. Branen provides no teaching or suggestion as to how "finely divided granular cellulosic material (bulk density 30 pounds per cubic foot)" (Column 4, lines 40-41.) that is used in each of his examples is obtained. Applicants respectfully resubmit, that in order to increase the bulk density of the cellulose in granular form, to about 30 lbs per cubic foot, Branen may be extensively cutting or grinding the purified cellulose, thereby reducing its molecular weight. Applicants respectfully submits that the present amendment to claim 41, distinguishes the presently claimed process over the process taught in Branen.

Applicants respectfully submit that Branen contains no teaching or suggestion to the person of ordinary skill in the art to substitute the high bulk density raw cotton linters wherein the cutting is carried out in a rotary cutter, as taught and claimed by applicants for the purified cellulose in granular form having a bulk density of about 30 pounds per cubic foot which is produced by an unnamed process for starting materials taught as useful in its process. Applicants respectfully submit that neither Branen, Hayakaw nor Henry provide any teaching, guidance, suggestion or motivation to use a rotary cutter to cut raw cotton linters for use in a process for making a cellulose ether derivatives.

Applicants respectfully assert that the rejection of claims 41-43, 46, 48, 49, 51, 56, 57, 63-66 and 94-96 and 98-103 as being unpatentable over Hayakawa or Henry in view of Branen is traversed. Applicants respectfully request withdrawal of the rejection of claims 41-

43, 46, 48, 49, 51, 56, 57, 63-66 and 94-96 and 98-103 under 35 U.S.C. §103(a) and request the allowance of these claims.

In paragraph 5 of the Office Action, claim 47 was rejected under 35 USC § 103(a) as being unpatentable over Hayakawa or Henry in view of Branen further in view of Savage (US Patent No. 2,949,452).

The Office Action states that "... the Savage patent suggests that the preparation of cellulose ethers using cotton linters as the starting material (see column 2, 3<sup>rd</sup> paragraph) and organic amines as the basic material (see column 2, line 26) is well known in the art." The Office Action also states that "[I]t would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute the base used in the preparation of cellulose ethers of the Hayakawa et al or Henry et al patent in view of the Branen et al patent with organic amines in view of the recognition in the art, as evidenced by the Savage patent."

Applicants respectfully submit that, while Savage suggests that the preparation of cellulose ethers using cotton linters as the starting material and organic amines as the basic material, Savage does not provide the necessary teaching or suggestion lacking in Hayakawa or Henry in view of Branen as discussed hereinabove in the traversal of the rejection of claims 41-43, 46, 48, 49, 51, 56, 57, 63-66 and 94-96 and 98-103. Applicants also respectfully submit that although Savage does state that "Although any form of cellulose may be employed in the process," (Column 2, lines 18-19.), Savage goes on to state that "...it should be apparent that the form used must be capable of substantially uniform penetration and of swelling by the basic material at the concentrations and temperatures employed." (Column 2, lines 19-22.) Applicants respectfully resubmit that the above passages would not suggest or motivate a person having ordinary skill in the art to use raw cotton linter as the cellulose source since raw cotton linters are admittedly a non-uniform material comprising cellulose, hemicellulose, lignin or other colored impurities and foreign matter. Applicants have additionally amended claim 41 to insert the teaching found at the bottom of page 12, line 34 to page 13, lines 1-2, where the upper limit of the cellulose found in the raw cotton linter is stated as 95 wt%. Applicants respectfully submit that the above-quoted passages of Savage would actually teach away from the use of raw cotton linters to a person having ordinary skill in the art, since the use of such a non-uniform material would not be considered to have substantially uniform penetration of the basic material at the concentrations and temperature employed in Savage.

Applicants respectfully assert that the rejection of claim 47 as being unpatentable over Hayakawa or Henry in view of Branen further in view of Savage is traversed. Applicants respectfully request withdrawal of the rejection of claim 47 under 35 U.S.C. §103(a) and request the allowance of this claim.

In paragraph 7 of the Office Action, claims 58-62 were rejected under 35 USC § 103(a) as being unpatentable over Hayakawa or Henry in view of Branen further in view of in view of Newbury et al. (US Patent No. 6,069,355).

Applicants respectfully submit that Newbury does not provide the necessary teaching or suggestion lacking in Hayakawa or Henry in view of Branen as discussed hereinabove in the traversal of the rejection of claims 41-43, 46, 48, 49, 51, 56, 57, 63-66 and 94-96 and 98-103. Applicants respectfully additionally submit that, while Newbury does state that the viscosity of its "...cellulose raw material may be reduced if desired by such known techniques as irradiation, steam explosion, chemical treatment (including in particular acid hydrolysis and oxidative chain scission) or enzymatic treatment (e.g. using a cellulase). Alternatively, previously processed cellulose material, for example waste viscose rayon, may be used as part or all of the low-viscosity component." (Column 2, line 67 to Column 3, line 7.), the process of Newbury is for the production of "extruded lyocell articles such as fibers and films, wherein a solution of cellulose in an aqueous tertiary amine N-oxide solvent is extruded through a die into a coagulating bath. "Lyocell" is the generic name for cellulose produced by solvent extrusion or solvent-spinning processes of this kind." (Column 1, lines 4-10.), it does not disclose either the use of raw cotton linters or the production of cellulose ether derivatives. Applicants respectfully submit that a person having ordinary skill in the art would not look to Newbury for guidance on reducing the viscosity of cellulose raw material as a raw material in a process for making cellulose ether from a raw cotton linter, having a certain high bulk density and a certain fiber size, where the cellulose material of Newbury is in solution and where the object of the process is production of solvent extruded or solvent-spun fibers. Additionally, applicants respectfully submit that the cellulose materials of Newbury actually teach away from the raw cotton linters of the present invention in that the cellulose materials of Newbury would be more refined than the unrefined raw cotton linters or even the purified cotton linters, since Newbury recites "waste viscose rayon", a highly purified form of cellulose, may be used as a raw material.

Applicants respectfully submit, that while Newbury does teach various means for the reduction of the viscosity of cellulose, the cellulose in the process of Newbury is in a solvated state, the process using the cellulose is for making cellulose structures and not a cellulose ether derivative, the cellulose of use in Newbury is highly purified, all contribute to making the teaching of Newbury not obvious to a person having ordinary skill in the art of manufacturing cellulose ether derivatives. Additionally, as stated above, applicants respectfully submit that Newbury does not provide the necessary teaching or suggestion lacking in Hayakawa or Henry in view of Branen as discussed hereinabove in the traversal of the rejection of claims 41-43, 46, 48, 49, 51, 56, 57, 63-66 and 94-96 and 98-103.

Applicants respectfully assert that the rejection of claims 58-62 are rejected under 35 USC § 103(a) as being unpatentable over Hayakawa or Henry in view of Branan further in view of in view of Newbury is traversed. Applicants respectfully request withdrawal of the rejection of claims 58-62 under 35 U.S.C. §103(a) and request the allowance of these claims.

#### **Amendment to Claims**

Applicants have amended claim 41 as well as claims 98-103 to recite that the raw cotton linters are "raw cut cotton linters". Support for these amendments may be found on page 14, lines 20-26 as well, amongst other places.

Applicants have amended claim 41 to recite "the upper limit of cellulose content in the fibers in the cut mass of raw cotton linters is 95 wt%". Support for this amendment may be found at the bottom of page 12, line 34 to page 13, lines 1-2.

Applicants have amended claim 41 to recite "the molecular weight of the raw cut cotton linter fibers as determined by intrinsic viscosity (IV) has not been reduced by more than 20% relative to non-comminuted raw cotton linters". Support for this amendment may be found on page 12, lines 28-32. The method for determining the IV of raw cotton linters may be found on page 20, lines 12-30.

### CONCLUSION

In view of the reasons set forth above, applicants respectfully request withdrawal of the above-mentioned rejections of record, and the allowance of all pending claims, and the holding of this application in condition for allowance. If any points remain of issue that may best be resolved through a personal or telephonic interview, the Examiner is respectfully requested to contact the undersigned at the below-listed telephone number.

Except as otherwise stated in the above-noted remarks, applicants notes that each of the amendments have been made to place the claims in better form for U.S. practice, not to distinguish the claims from prior art references, otherwise narrow the scope of the previously pending claims or comply with the other statutory requirements.

Respectfully submitted,

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